Testing an automated homogenization procedure for large multivariate datasets

M. Begert (1), E. Zenklusen (1), C. Häberli (1), C. Appenzeller (1), L. Klok (2)

(1) Federal Office of Meteorology and Climatology (MeteoSwiss), Zürich, Switzerland, (2) Royal Netherlands Meteorological Institute (KNMI), De Bilt, The Netherlands (michael.begert@meteoswiss.ch / Fax: +41 44 256 92 78)

Within the framework of the EU-project ENSEMBLES, an automated relative homogenization procedure to detect shift inhomogeneities in climatological time series was developed and used for the homogeneity assessment of a large multivariate European dataset including values for temperature (min, mean, max), precipitation and air pressure covering at least 45 years. The automated process combines VERAQC (Vienna Enhanced Resolution Analysis Quality Control) output with Alexandersson's SNHT (Standard Normal Homogeneity Test). VERAQC is designed to find outliers, systematic errors and meteorological biases in a time series comparing the data with concurrent observations of neighbouring stations. The resulting deviations can be analysed as time series for a single station and used as an input for relative homogeneity testing. Shift inhomogeneities are detected in accordance with statistical significance. An iterative procedure ensures that multiple break points in a series are detected. The performance of the automated homogenization method was tested comparing its findings to results of a carefully homogenized Swiss data set. The latter is based on a relative homogenization procedure in combination with station history information and requires a large amount of manual input. It is shown that the new automated procedure is able to detect shift inhomogeneities in temperature, precipitation and air pressure series but several limitations exist. For example the number of false alarms as well as missed break points is comparatively high at least in the Swiss Alpine test region with its complex topography.